

## On some wood-inhabiting dematiaceous hyphomycetes with remarkable conidia in Belarus

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A series of dematiaceous fungi species are rather common on dead wood and well discernible in herbarium material thanks to remarkable conidia shape

In the course of microscopic examination of wood-inhabiting fungi from Belarus territory we observed a series of dark-colored hyphomycetes with well discernible conidia of remarkable shape. Part of them were found as common in a number of sites, formed characteristic complexes with other hyphomycetes, and were frequently observed in association with fruitbodies of corticioid fungi (*Basidiomycetes*). To facilitate the further study in ecology, geography, and taxonomy of these mitospore fungi we have undertaken morphological description and illustration of ten taxa.

Mounting of the material for microscopy was carried out in 5% KOH water solution. All cited specimens were collected by the author and are kept in the section "Fungi" of the herbarium of Kuprevich Institute of Experimental Botany, Minsk, Belarus (MSK-F).

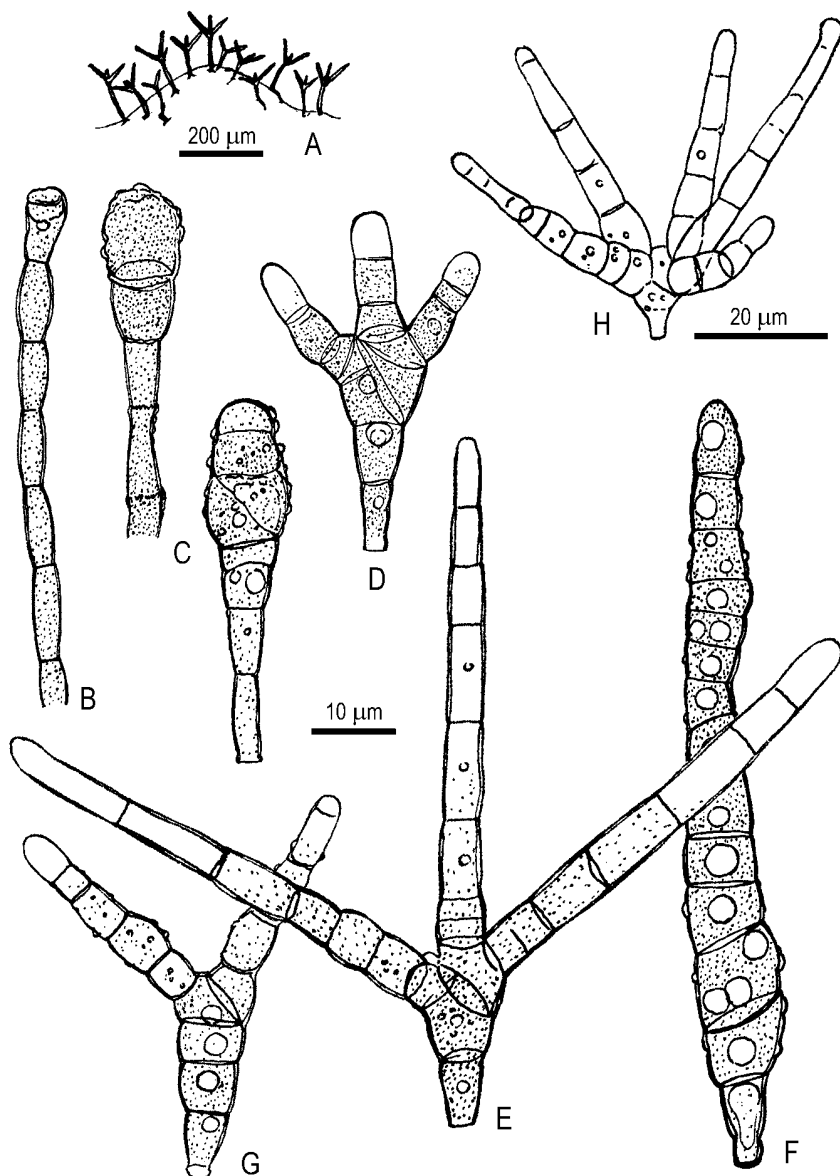
In the specimens characterization the district of Belarus name is followed by the nearest settlement name, then phytocoenosis name, substratum and position, date of collection, reference MSK number. The phytocoenosis type naming in the list is built of the main plants Latin names, separated by dashes. The dominant (and co-dominant) species are arranged according their level from mosses to trees, the first name is the prevalent species in herb or moss cover, the last name is the dominant of main tree level. The authorship formulation for host plants and accompanying fungi names is added at the first their mention in the text.

### Species descriptions

**1. *Actinocladium rhodosporum*** Ehrenb. : Fr., Syst. mycol. 3: 325, 1832; Ehrenberg, Jb. Gewächskde 1: 52, 1819. — Fig. 1, 2.\*

Colonies commonly undiscernible by naked eye, effused, sometimes forming diffuse blackish spots. The fungus appears as more or less scattered erect conidiophores. Mycelium poorly developed, immersed in substratum or partly superficial. Hyphae grayish, smoky brown, brown, mostly flexuous, 2–5 µm wide, septa 3–15 µm apart, walls moderately thin. Conidiophores brown to dark brown, ca. 30–40 µm long, about 6 µm wide at base, 3–3.2 µm wide under the conidium, with thickened and uneven wall, cells 6–12 µm long. Immature conidia (conidial primordia) clavate or fusiform, unbranched, 27–40 × 8.5–10 µm. Conidia dark olivaceous gray,

\* All drawings by the author.



**Fig. 1.** *Actinocladium rhodosporum* Ehrenb. : Fr.: A — sketch of a group of conidiophores with conidia, B — conidiophore, C — conidial primordia, D — young conidium, E — typical mature 3-armed conidium, F — atypical unbranched conidium, G — atypical 2-armed conidium, H — atypical 5-armed conidium.

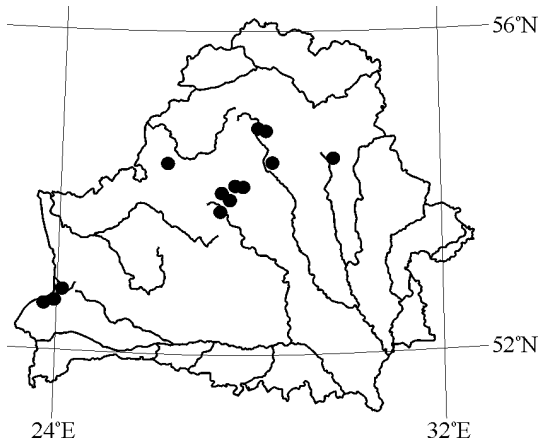
A-D, F, G — MSK 5884, E — MSK 5887, H — MSK 6077.

gray brown, or olivaceous brown; commonly with 2–3 arms radiating from the stalk, angle between arms 45–80°; outer wall smooth to uneven or warted in the middle part of the conidium; basal cell of the conidium stalk conical, *ca.* 5–7.5  $\mu\text{m}$  long, 5–6  $\mu\text{m}$  wide; conidium stalk dark brown, 10.5–13.5  $\mu\text{m}$  wide. Arms up to 55–80  $\mu\text{m}$  long, 5–7 (10.5)  $\mu\text{m}$  wide at the base, 2.5–4.3  $\mu\text{m}$  wide at the tip, 5–11 septate, straight or some curved, smooth, rough or warted in basal part, less pigmented toward the tip, in immature conidia arm tips subhyaline. Sometimes conidia unbranched, totally 53–87  $\times$  9–10  $\mu\text{m}$ , fusiform, 8–10 septate.

Unbranched conidia are common in MSK 5039. Abnormal pale colored conidiophores we observed in MSK 6077, together with occasional 4–5-armed conidia (fig. 1 H).

**General distribution and hosts:** Europe, Asia, Africa. In West Europe commonly on *Betula*, *Corylus*, *Quercus*, *Sorbus*, *Picea* and other plants (Ellis, 1971). For the former USSR the species was reported only from Far East, on *Taxus* (Melnik, 2000).

**Accompanying species:** in Belarus the fungus was found together with hyphomycetes *Brachysporium nigrum* (Link) S. Hughes, *Cryptocoryneum condensatum*, *Monodictys paradoxa*, *Taeniolina scripta*, *Tropospora fumosa*, and in complex with basidiomycetes *Hyphodontia breviseta* (P. Karst.) J. Erikss., *Hyphodontia* sp. (MSK 6049), *Schizopora paradoxa* (Schrad. : Fr.) Donk, *Trechispora microspora* (P. Karst.) Libert, *Tylospora fibrillosa* (Burt) Donk, and especially with *Hyphoderma setigerum* (Fr. : Fr.) Donk.



**Fig. 2.** Distribution of *Actinocladium rhodosporum* Ehrenb. : Fr. in Belarus.

**Specimens examined:** Barysau district, Kishchyna Slabada, moss–*Oxalis acetosella*–*Picea abies* forest, on lower side of thin fallen *Pinus sylvestris* L. trunk, on bark, 21 IX 2001 (MSK 6082). — Kamyanets district, Belavezhskaya Pushcha National Park, Yelinski Bor\*, *Oxalis acetosella*–*Picea abies*–*Alnus glutinosa* forest, on still-attached dead twig of *Corylus avellana* L.,

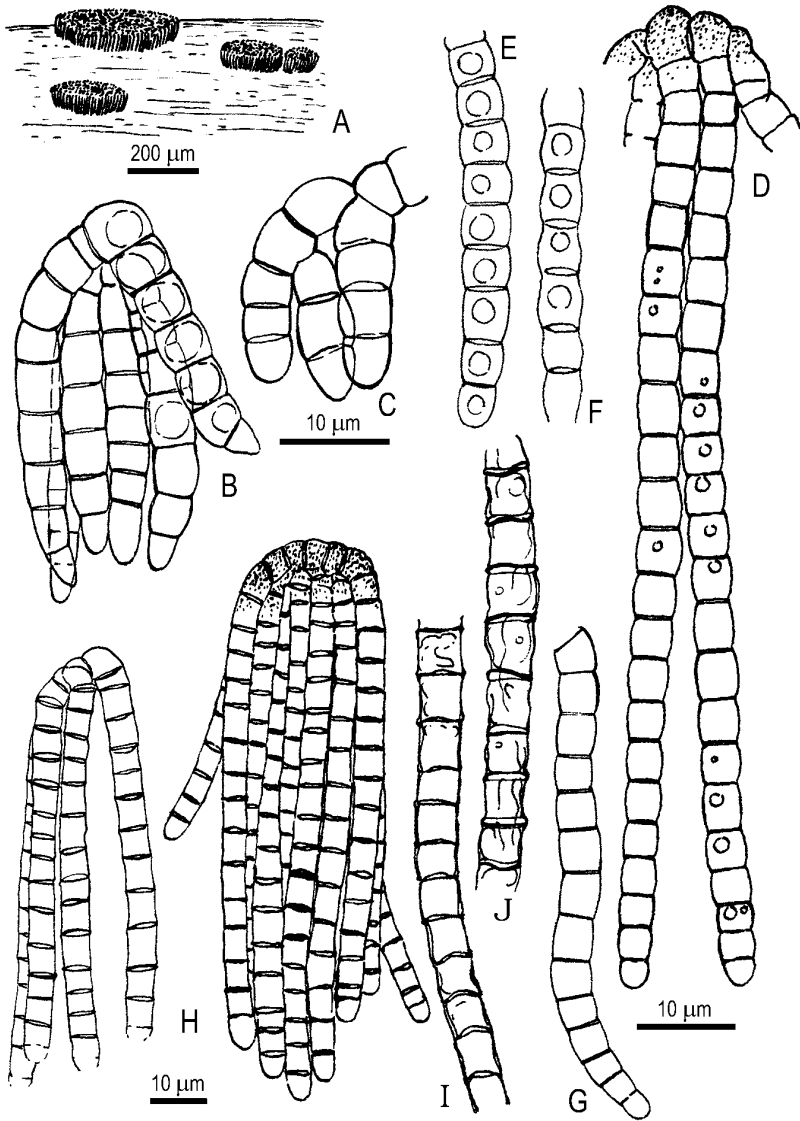
\* Here the transliteration of “E” Cyrillic (as the first letter of the word) → “Ye” (English) is used.

on bark, 25 VI 2001 (MSK 6077). — *ibid.*, *Oxalis acetosella*–*Calamagrostis arundinacea*–*Corylus avellana*–*Picea abies* community, on dead still-attached twig of *Quercus robur* L., on bark, 29 VI 2001 (MSK 6046). — **Lahoisk** district, Litvinkava, *Oxalis acetosella*–*Galeobdolon luteum*–*Picea abies* forest, on dead still-attached twig of *Pyrus communis* L., on wood, 10 IV 1994 (MSK 5039). — *ibid.*, Prysylki, *Picea abies*–*Pinus sylvestris* forest, on dead wood of *Malus sylvestris* Mill., 15 IX 1995 (MSK 5885). — *ibid.*, Litvinkava, *Stellaria holostea*–*Alnus incana*–*Picea abies*–*Populus tremula* forest, on dead vertical trunk of *Corylus avellana*, on bark, 16 II 1999 (MSK 6076). — *ibid.*, *Oxalis acetosella*–*Stellaria holostea*–*Corylus avellana*–*Populus tremula*–*Picea abies* forest, on vertical dead trunk of *Corylus avellana*, on wood, 30 IV 2001 (MSK 5845). — **Lepel'** district, Byarezinski Biosphere Reserve, Stvol'na, *Filipendula ulmaria*–*Athyrium filix-femina*–*Picea abies*–*Betula pubescens*–*Alnus glutinosa* forest, on fallen piece of dead *Alnus glutinosa* (L.) Gaertn. bark, 5 VI 1999 (MSK 4852). — *ibid.*, *Filipendula ulmaria*–*Urtica dioica*–*Betula pubescens*–*Alnus glutinosa* forest, on thin fallen trunk of *Salix cf. cinerea* L., on decayed wood, 11 VI 2000 (MSK 5629). — **Minsk**, Drazdy, *Hepatica nobilis*–*Stellaria holostea*–*Quercus robur*–*Picea abies* grove, on bark of *Corylus avellana* stump, 11 XII 2000 (MSK 5884). — Minsk district, Syalets, *Populus tremula*–*Picea abies* forest, on vertical decayed trunk of *Quercus robur*, on wood, 27 XII 1992 (MSK 5887). — *ibid.*, Pryluchki, *Aegopodium podagraria*–*Oxalis acetosella*–*Picea abies*–*Quercus robur* forest, on fallen trunk of *Populus tremula* L., on wood, 24 IV 2001 (MSK 5821). — **Pruzhany** district, Belavezhsкая Pushcha National Park, Visculi, *Oxalis acetosella*–*Pinus sylvestris*–*Picea abies* forest, on dead still-attached thin twig of *Carpinus betulus* L., on bark, 28 VI 2001 (MSK 6013). — **Smarhon'** district, Kreva, *Oxalis acetosella*–*Stellaria holostea*–*Picea abies*–*Populus tremula* forest, on fallen twig of *Populus tremula*, on wood, 27 V 2001 (MSK 5888). — **Svislach** district, Belavezhsкая Pushcha National Park, Rudnya, *Oxalis acetosella*–*Carpinus betulus*–*Populus tremula* forest, on decayed fallen wood of *Carpinus betulus*, 27 VI 2001 (MSK 6049). — **Talachyn** district, Ryzhychy, moss–*Oxalis acetosella*–*Picea abies* forest, on fallen branch of *Alnus incana* (L.) Moench, on bark, 22 IV 2001 (MSK 5886).

## 2. *Cryptocoryneum condensatum* (Wallr.) E.W. Mason et S. Hughes in Rimington, Nat. Hist. Scarborough Distr. 1: 161, 1953. — Fig. 3, 4.

Mycelium inconspicuous. Sporodochia badly discernible, dark brown or black, orbicular, flattened, 0.28–0.8 × 0.25–0.4 mm, covered by the conidia palisade. Cells of stroma brown gray to dark brown, 3.3–12 × 3.3–10 μm, commonly 5–6 μm diam, thick-walled. Conidiophores arising from the stromatic cells, simple, slender, masked by the conidial arms, hyaline or yellowish, 1.7–2 μm wide, 1.5 μm wide at the base, bearing single conidium, stretching simultaneously with conidial arms. Conidiogenous cells monoblastic, terminal, determinate. Conidia cheiroid, 13.5–23.5 μm wide, consist of group of cap cells producing 4–14 arms arranged parallel or slightly in fan-shaped pattern and growing downwards to the substratum. Cap cells dark olivaceous gray, up to 5.5 μm wide. Arms simple, occasionally branched in the lower half, straight of slightly bent, 10–17-phragmoseptate, somewhat constricted at the septa, 40–50 (95) μm long, 3.7–4.5 (5) μm wide at the base and 2.7–3.7 μm wide at the tip, olivaceous gray, smoky olivaceous at the base, pale in upper part; arm cells 3.3–4.3 μm long, young with a guttule, apical arm cell rounded, blunt conical, rarely almost mucronate, the least pigmented. In old conidia arms brown, closely parallel gathered together, with thickened septa and wrinkled outer walls.

Schoknecht and Crane (1977) describe the hyphae of the fungus as immersed, subhyaline.

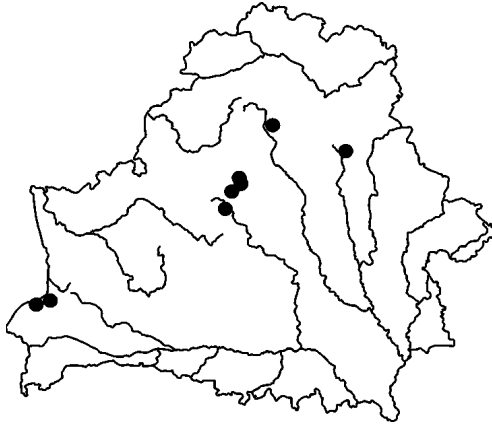


**Fig. 3.** *Cryptocoryneum condensatum* (Wallr.) E.W. Mason et S. Hughes: A — view of sporodochia, B — young conidium, C — a part of young conidium with arm branching, D — arms of mature conidium, E, F — parts of conidial arms with guttulate cells, G — a bent conidial arm, H — old conidia, I, J — arms of old conidia.

A, E — MSK 5792, B, C, G — MSK 5841, H, I — MSK 5778, F, J — MSK 4659.

**General distribution and hosts:** Europe, Asia, N. America. For the territory of former USSR the species was described for Georgia, Krasnodar region, and Far East, on wood of different angiosperms, e. g. *Betula*, *Corylus*, *Quercus* (Melnik, 2000). In West Europe the species spread as common, mostly on angiosperms, e. g. *Acer*, *Betula*, *Corylus*, *Fraxinus* (Ellis, 1971; Schoknecht, Crane, 1977). By Heftberger et al. (1997) the fungus was registered in Europe presumably in low mountain moist *Fagus* forests.

**Accompanying species:** in Belarus the fungus was found together with *Actinocladium rhodosporum*, *Brachysporium nigrum*, *Helicosporium virescens*, *Taeniolina scripta*, *Tropospora fumosa*, and in association with basidiomycetes *Athelia epiphylla* complex, *Athelia* sp. (MSK 5792), *Hyphoderma setigerum*, *Hyphodontia* sp. (MSK 4659), *Schizopora paradoxa*.



**Fig. 4.** Distribution of *Cryptocoryneum condensatum* (Wallr.) E.W. Mason et S. Hughes in Belarus.

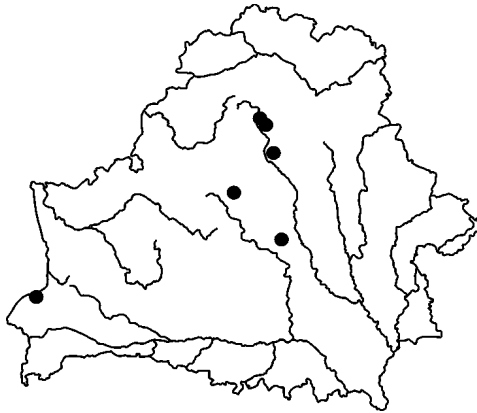
**Specimens examined:** **Kamyanets** district, Belavezhskaya Pushcha National Park, Yelinski Bor, *Oxalis acetosella*–*Populus tremula*–*Picea abies* forest, on lower side of fallen branch of *Corylus avellana*, on bark, 25 VI 2001 (MSK 6042). — **Lahoisk** district, Litvinkava, *Oxalis acetosella*–*Stellaria holostea*–*Corylus avellana*–*Populus tremula*–*Picea abies* forest, on fallen twig of *Sorbus aucuparia* L., on bark (MSK 5841), on vertical dead trunk of *Corylus avellana*, on wood (MSK 5845), on fallen twig of *Corylus avellana*, on wood (MSK 5879), 30 IV 2001. — **Lepel'** district, Byarezinski Biosphere Reserve, Domzharytsy, *Oxalis acetosella*–*Aegopodium podagraria*–*Corylus avellana*–*Populus tremula*–*Picea abies* forest, on lower side of fallen branch of *Fraxinus excelsior*, on bark (MSK 4887), on dead wood of *Fraxinus excelsior* trunk (MSK 4889), 4 VI 1999. — **Minsk**, Drazdy, *Hepatica nobilis*–*Stellaria holostea*–*Quercus robur*–*Picea abies* grove, on bark of *Corylus avellana* stump, 11 XII 2000 (MSK 5884). — Minsk district, Astrashytski Haradok, group of tree near a national road, on still-attached dead branch of *Malus domestica*, on wood, 17 I 1996 (MSK 4659). — *ibid.*, Pryluchki, *Aegopodium podagraria*–*Oxalis acetosella*–*Picea abies*–*Quercus robur* forest, on fallen twig of *Quercus robur*, on bark (MSK 5796), on fallen twig of *Corylus avellana*, on decayed wood (MSK 5807), on fallen trunk of *Populus tremula*, on wood (MSK 5821), 24 IV 2001. — **Pruzhany** district, Belavezhskaya Pushcha National Park, Visculi, *Oxalis acetosella*–*Pinus sylvestris*–*Picea abies* forest, on dead still-attached thin twig of *Carpinus betulus*, on bark, 28 VI 2001 (MSK 6013). — **Talachyn** district, Mikhailoushchyna,

*Oxalis acetosella*–*Populus tremula*–*Quercus robur*–*Picea abies* forest, on fallen twig of *Sorbus aucuparia*, on wood (MSK 5778), on lower side of fallen trunk of *Sorbus aucuparia* not in contact with floor, on bark (MSK 5785), on lower side of fallen trunk of *Sorbus aucuparia*, on bark (MSK 5786), on fallen trunk of cf. *Quercus robur*, on wood (MSK 5792), 22 IV 2001.

**3. *Excipularia fusispora*** (Berk. et Broome) Sacc., Syll. fung. 3: 689, 1884. — Fig. 5, 6.

Conidiomata ca. 170  $\mu\text{m}$  diam, pulvinate, bearing conidiophores and setae. Setae almost straight to commonly sabre-curved, 36–60  $\times$  1.7–2.5  $\mu\text{m}$ , dark brown, with thickened wall and rounded tip, at the base pale brown; 3-septate curved pale brown setae present in little amount, ca. 48  $\times$  1.7  $\mu\text{m}$ . Conidiophores slender, hyaline, ca. 1  $\mu\text{m}$  wide. Conidiogenous cells monoblastic, determinate. Conidia terminal, fusoid, curved, sometimes straight (the latter possibly affected by a conidium orientation under the microscope), 26–39  $\times$  3–4.5 (5.8)  $\mu\text{m}$ , 7–9-septate, with or without shallow constrictions; septa in old conidia up to 1.3  $\mu\text{m}$  thick; terminal cells of the conidium hyaline to subinvisible, conical, 3.3–6.3  $\times$  2.5–3.3  $\mu\text{m}$ , quickly wrinkling and easily losing.

Conidiomata and setae are difficult to find in most cases. Scattered conidia are common on decayed wood and bark of leaf trees.

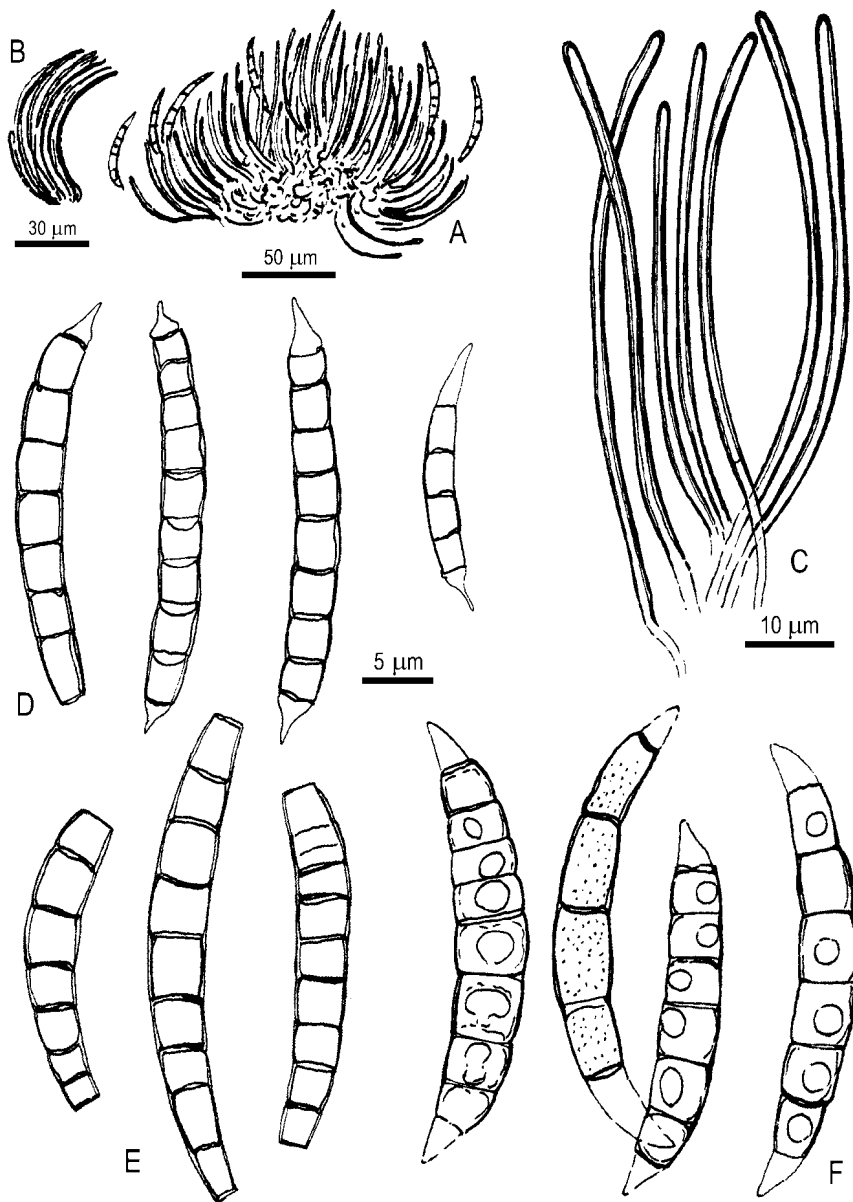


**Fig. 5.** Distribution of *Excipularia fusispora* (Berk. et Broome) Sacc. in Belarus.

**General distribution and hosts:** Europe, Asia. On different angiosperms, both trees and shrubs. In north-central Europe (Leningrad region) the fungus was observed on decayed bark of *Alnus incana* and *Populus tremula* (Melnik, 2000).

**Accompanying species:** commonly the fungus is found in association with *Taeniolella alta* colonies and *Hyphoderma setigerum* basidiomata; sometimes near *Peniophora polygonia* (Pers. : Fr.) Bourdot et Galzin fruitbodies (MSK 5932), in association with *Hyphodontia breviseta*, *Peniophora* sp. (MSK 6073), and *Trechispora microspora* basidiomata.

**Specimens examined:** Asipovichy district, Vyalikaya Harozha, moss–*Quercus robur*–*Picea abies* forest, on fallen branch of *Alnus glutinosa*, on bark, 5 III 2000 (MSK 4992). — Barysau district, Kishchyna Slabada, moss–*Oxalis acetosella*–*Picea abies* forest, on lower side of thin fal-



**Fig. 6.** *Excipularia fusispora* (Berk. et Broome) Sacc.: A — conidioma, B — cluster of setae, C — setae, D, E, F — conidia.

A, B, C, D — MSK 5932, E — MSK 4843, F — MSK 4979.



len *Pinus sylvestris* trunk, on bark, 20 IX 2001 (MSK 6082). — **Kamyanets** district, Belavezhskaya Pushcha National Park, Kamyanyuki, *Oxalis acetosella*–*Populus tremula*–*Picea abies* forest, on fallen branch of *Populus tremula*, on bark, 26 VI 2001 (MSK 5932). — **Lepel'** district, Byarezinski Biosphere Reserve, Kvetcha, *Carex acutiformis*–*Betula pubescens*–*Alnus glutinosa* forest, on fallen branch of *Alnus glutinosa*, on decayed wood, 3 VI 1999 (MSK 4843). — *ibid.*, Rozhna, *Filipendula ulmaria*–*Urtica dioica*–*Betula pubescens*–*Alnus glutinosa* forest, on thin fallen trunk of *Salix cf. cinerea*, on decayed wood, 11 VI 2000 (MSK 5629). — **Minsk**, tree plantation in a city block, on dead trunk of *Cerasus vulgaris* Mill., on bark (without outer layer), 8 VI 1994 (MSK 4979). — *ibid.*, tree and shrub plantation along a street, on dead bark of *Syringa vulgaris* L., 19 X 2001 (MSK 6073).

#### 4. *Exosporium tiliae* Link ex Schldtl., Synop. Pl. crypt.: 140, 1824. — Fig. 7, 8.

Colonies punctiform. Stromata pulvinate, almost semiglobose, *ca.* 0.43 mm diam, covered by erect conidiophores in hedgehog-like pattern. Cells of stroma 6.7–11.5  $\mu\text{m}$  diam, black. Conidiophores 4–5-septate, 75–100  $\mu\text{m}$  long, 8–10 wide, slightly wider at the tip, sometimes with apical swelling 14–15  $\mu\text{m}$  wide. Outer conidiophore wall thickened at the apex, with the central conidium-producing channel. Conidia massive, obclavate, olivaceous brown or yellowish brown to brown, immature 42–50  $\times$  11–14  $\mu\text{m}$ , with (3) 5–6 pseudosepta, tip 8–11  $\mu\text{m}$  wide; mature 82–116  $\times$  11–15  $\mu\text{m}$ , with 10–13 pseudosepta and frequently destroyed tip, sometimes with sprout hypha in tip region; wall even or rough; conidium base with doliiform, clearly truncated black scar.

Close species is *Corynespora olivacea* (Wallr.) M.B. Ellis having 0–1-septate short conidiophores, some with rounded terminal proliferation (Ellis M. B., Ellis J. P., 1987).

**General distribution and hosts:** Europe, Asia. On bark and wood of *Tilia* spp.

**Accompanying species:** old colonies of MSK 5690 is partly overgrown by *Peniophora cinerea* (Pers. : Fr.) Cooke basidioma.

**Specimens examined:** **Minsk**, *Tilia* plantation in a city block, on fallen twigs of *Tilia cordata* Mill., on bark, 16 VII 2000 (MSK 5690). — **Valozhyn** district, Kaldyki, *Aegopodium podagraria*–*Stellaria holostea*–*Corylus avellana* community, on still-attached dead branches of *Tilia cordata*, on bark, 12 VI 1993 (MSK 5052).

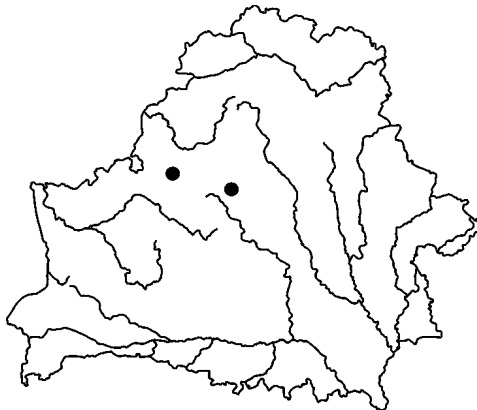
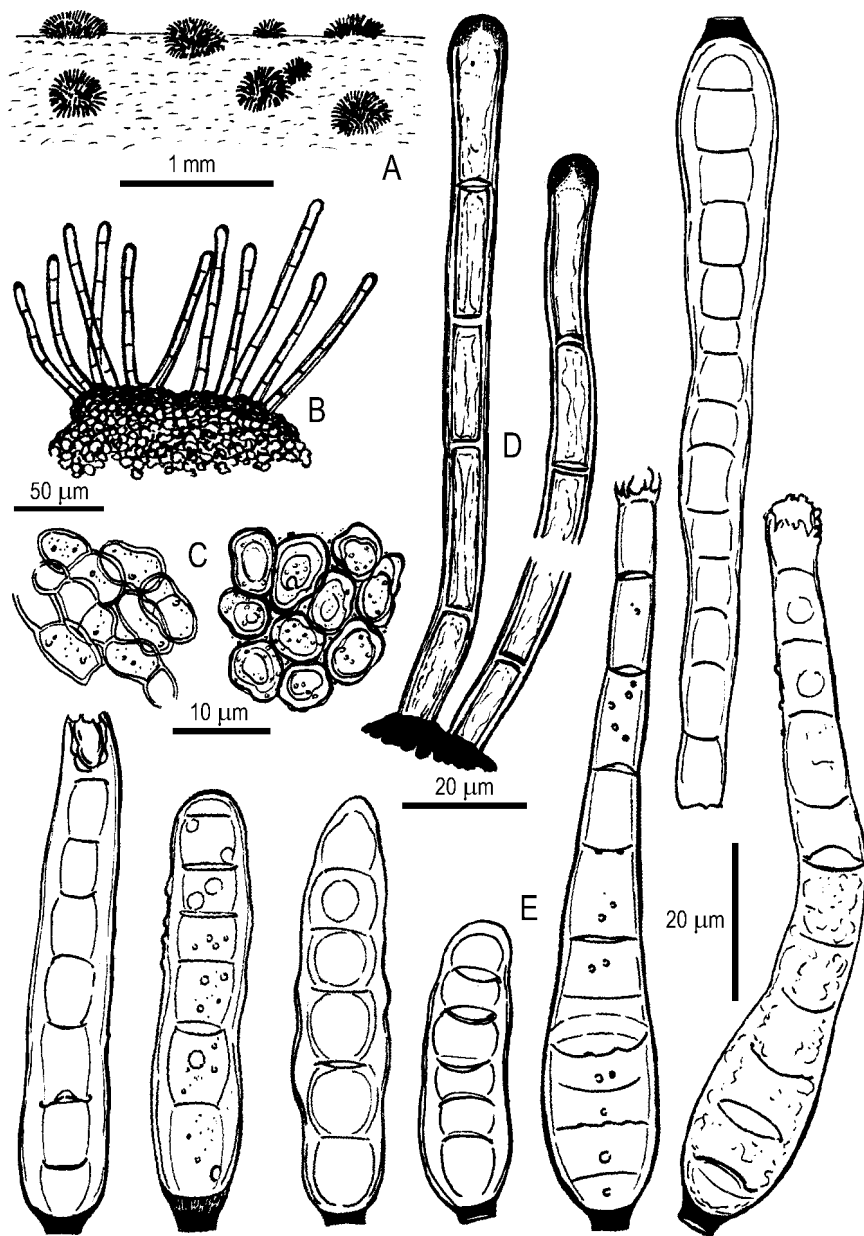


Fig. 7. Distribution of *Exosporium tiliae* Link ex Schldtl. in Belarus.



**Fig. 8.** *Exosporium tiliae* Link ex Schltdl. (MSK 5052): A — view of colonies, B — section through a stroma with conidiophores, C — stromatic cells, D — conidiophores, E — conidia on different stages of development.

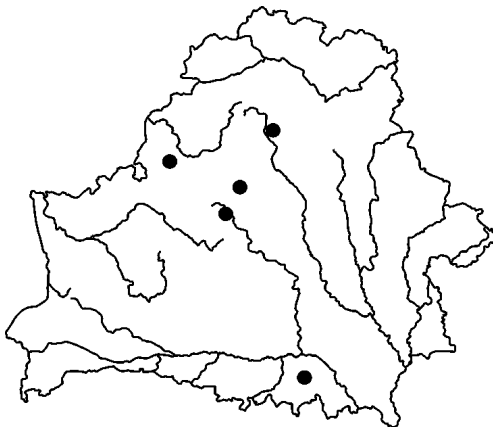
**5. *Helicosporium virescens*** (Pers.) Sivan., Bitunicate Ascomycetes: 591–592, 1984; *H. vegetum* Nees, Syst. Pilze Schwämme: 68, 1817. — Fig. 9, 10.

This is the imperfect state of ascomycete ***Tubeufia cerea*** (Berk. et M.A. Curtis) Höhn (Barr, 1980; Ellis M. B., Ellis J. P., 1987; Goos, 1989); perithecia of the latter are occasionally found together with the anamorph, both on wood and bark (MSK 4887, 5872).

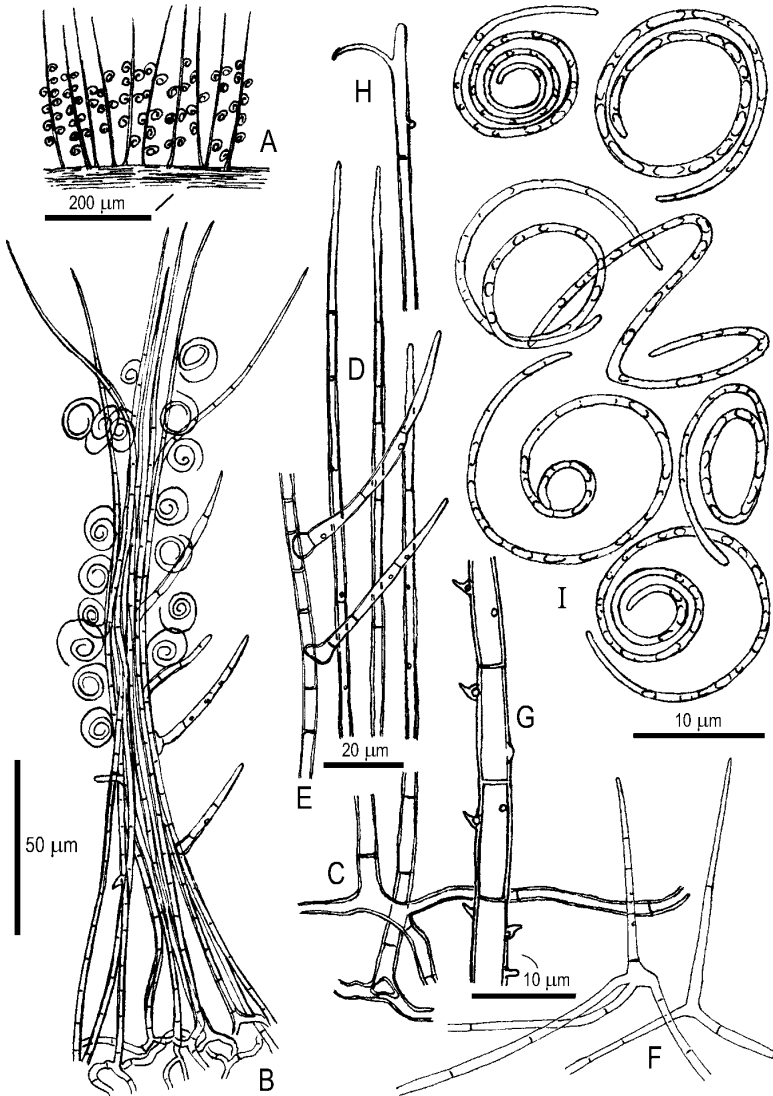
Colonies greenish yellow, greenish gray, olivaceous, in age gray brown, under the lens farinaceous or velvety, small (2–6 mm diam) to 40 mm and more in extent and covering small twigs. Mycelium repent or submerged, subhyaline to brown, 1.7–3.5  $\mu\text{m}$  wide, cells 8.5–37  $\mu\text{m}$  long. Conidiophores erect, subulate, brown, apically paler, 180–310 (365)  $\mu\text{m}$  long, 3.3–4.5 (7.5)  $\mu\text{m}$  wide at the base, 1.5–2.5  $\mu\text{m}$  wide at the tip, without swellings, wall gradually thickened toward the base; septa indistinct in upper portion of conidiophore, clear in lower portion, 6–14  $\mu\text{m}$  apart; base biradicate; apical portion of conidiophore setiform and presumably without conidiogeneous loci; some conidiophores with short lateral branches 3.3  $\mu\text{m}$  wide. Sometimes 2–3 conidiophores anastomosing above and forming one apex. Conidiogeneous cells polyblastic, intercalary, denticulate — loci short-cylindric or conical, 1.5–3  $\times$  1–1.3  $\mu\text{m}$ , hyaline. Conidia hyaline or subhyaline in mass, 14–22 (28)  $\mu\text{m}$  diam, filament 1.5–2.3 (3.3) times coiled in one plane or cochleate, 0.8–1  $\mu\text{m}$  wide, multiguttulate, indistinctly multiseptate or lacking septa.

**General distribution and hosts:** worldwide, mostly on wood of angiosperms. For East Europe is reported on *Alnus* and *Betula* (Melnik, 2000). In North America the common substratum is *Quercus*; sometimes on *Pinus* and on processed wood (Goos, 1989). *Tubeufia*-state was registered on *Acer*, *Betula*, *Corylus*, *Fraxinus*, *Quercus* (Ellis M. B., Ellis J. P., 1987).

**Accompanying species:** in Belarus the species was episodically found together with *Cryptocoryneum condensatum* and *Tomentella lapida* (Pers.) Stalpers.



**Fig. 9.** Distribution of *Helicosporium virescens* (Pers.) Sivan. in Belarus.



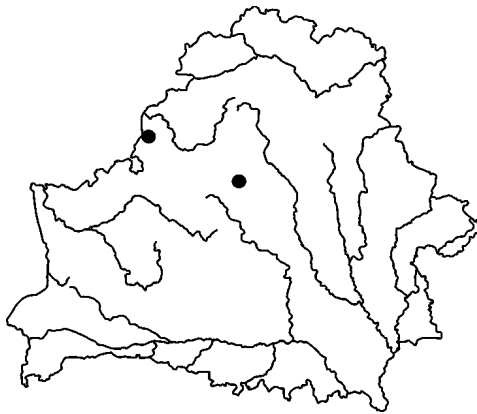
**Fig. 10.** *Helicosporium virescens* (Pers.) Sivan.: A — sketch of a part of colony, B — cluster of conidiophores, C — conidiophores bases, D — conidiophores upper portions, E — part of a conidiophore with short lateral branches, F — anastomosing conidiophores with a common apex, G — a part of conidiophore with conidiogenous loci (denticles), H — atypical blunt conidiophore apex and fragment of conidium filament, I — conidia.

A-F, H, I — MSK 5889, G — MSK 4916.

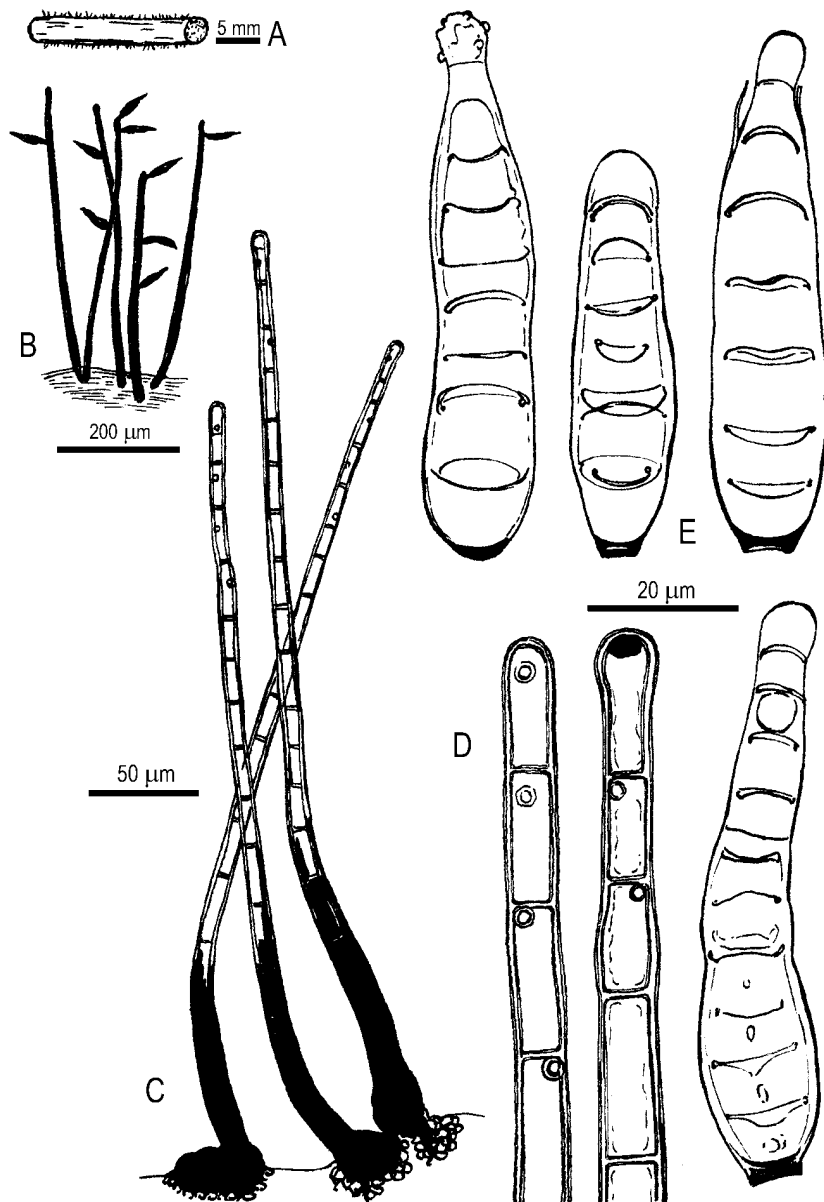
**Specimens examined:** Lahoisk district, Litvinkava, young *Populus tremula* stand with *Corylus avellana*, *Chamerion angustifolium*, *Stellaria holostea* on former cutted area, on base of dead *Rubus idaeus* L. stem, on wood, 26 VI 1994 (MSK 5890). — *ibid.*, *Oxalis acetosella*–*Stellaria holostea*–*Corylus avellana*–*Populus tremula*–*Picea abies* forest, on fallen twig of *Betula pendula* Roth, inside on bark (MSK 5862), on lower side of fallen twig of *Acer platanoides* L., on bark (MSK 5872), 30 IV 2001. — Lepel' district, Byarezinski Biosphere Reserve, Rozhna, *Pleurozium schreberi*–*Vaccinium myrtillus*–*Pinus sylvestris* forest, on fallen twig of *Betula pendula*, on bark, and partly on dead *Brachythecium* sp. shoot, 3 VI 1999 (MSK 4916). — *ibid.*, *Oxalis acetosella*–*Aegopodium podagraria*–*Corylus avellana*–*Populus tremula*–*Picea abies* forest, on lower side of fallen branch of *Fraxinus excelsior*, on bark and wood, 4 VI 1999 (MSK 4887). — Mazyr district, Melyashkovichy, *Majanthemum bifolium*–*Betula pendula*–*Pinus sylvestris* forest, on fallen branch of *Pinus sylvestris*, on wood, 3 V 1999 (MSK 6079). — Minsk district, Pryluchki, *Aegopodium podagraria*–*Oxalis acetosella*–*Picea abies*–*Quercus robur* forest, on fallen twig of *Acer platanoides*, on bark, 24 IV 2001 (MSK 5801). — Smarhon' district, Kreva, *Oxalis acetosella*–*Stellaria holostea*–*Picea abies*–*Populus tremula* forest, on fallen twig of *Betula pendula*, on bark, on fallen needles of *Picea abies* (L.) Karst., on decaying leaf debris of cf. *Betula pendula*, 27 V 2001 (MSK 5889).

**6. *Helminthosporium velutinum*** Link ex Ficinus et C. Schub., Fl. Geg. Dresd. Krypt.: 283, 1823. — Fig. 11, 12.

Colonies hairy. Mycelium gray brown, hyphae straight or flexuous, moderately thin-walled, 2.5–4.3  $\mu\text{m}$  diam, swollen to 5.5  $\mu\text{m}$ , septa *ca.* 10–20  $\mu\text{m}$  apart. Conidiophores growing from the stromatic nodes or bulbs *ca.* 30–40  $\mu\text{m}$  diam semi-immersed in the substratum. Cells of stromata 6–12  $\mu\text{m}$  long, more or less isodiametric to elliptical and angulate, with dark brown walls. Conidiophores dark brown, almost black in lower part, 300–850  $\mu\text{m}$  long, 14–23  $\mu\text{m}$  wide in lower portion, 8.5–10.5  $\mu\text{m}$  wide in upper portion, wall 2.5–6  $\mu\text{m}$  thick, septa 9–52  $\mu\text{m}$  apart, tip cylindrical or subcapitate. Conidiogeneous cells polytretic, terminal or intercalary, conidia arising through small pores, especially beneath the septa. Conidia obclavate, commonly distorted, gray brown, 31–68  $\times$  12.5–17  $\mu\text{m}$ , 6–7  $\mu\text{m}$  wide in



**Fig. 11.** Distribution of *Helminthosporium velutinum* Link ex Ficinus et C. Schub. in Belarus.



**Fig. 12.** *Helminthosporium velutinum* Link ex Ficus et C. Schub. (MSK 5041): A — view of colony on a twig, B — sketch of conidiophores with conidia, C — conidiophores, D — conidiophores upper portions with conidiogenous loci, E — conidia.

apex, with (6) 7–11 differently pronounced pseudosepta, cells with or without guttules; apical cell of the same color or yellowish, rounded to capitate; basal part of the conidium with doliiform large blackish scar.

**General distribution and hosts:** Europe, Asia, N. and S. America. For the former USSR the species was reported for Primor'e region, on *Acer*, *Alnus*, *Betula*, *Tilia*, and other angiosperms (Melnik, Popushoi, 1992). In Belarus the fungus was found on two non-aboriginal species of plants.

**Specimens examined:** Astravets district, Hudahai, grass–*Sorbus aucuparia*–*Pinus sylvestris* forest, on dead branch of *Amelanchier ovalis* Medik., on bark, 4 VI 1994 (MSK 5042). — Minsk district, Slaboshchyna, moss–*Oxalis acetosella*–*Picea abies*–*Pinus sylvestris* forest, on still-attached dead twig of *Physocarpus opulifolius* (L.) Maxim., 17 X 1993 (MSK 5041).

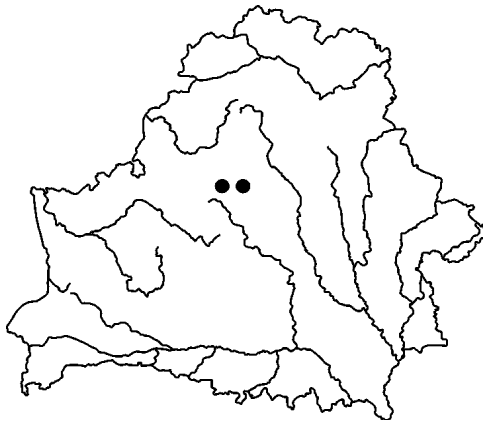
**7. *Monodictys paradoxa* (Corda) S. Hughes, Can. J. Bot. 36: 786, 1958. — Fig. 13, 14.**

Colonies presumably punctiform, subinvisible or very small. Mycelium mostly superficial. Conidiophores ca. 30–40  $\mu\text{m}$  long, yellow-brownish, pale brown, consist of chain of almost always swollen cells 5–16  $\mu\text{m}$  wide. Conidiogeous cell is the biggest, terminal, bladder-like, ellipsoid, with yellowish or greenish tint, with slightly thickened wall, frequently remaining at separated conidia. Conidia muriform, smooth, subglobose, ellipsoid to typically ovate, occasionally pyriform, globose, short-cylindrical, 15–40  $\times$  14–20  $\mu\text{m}$ , olivaceous, gray brown, dark brown, almost black.

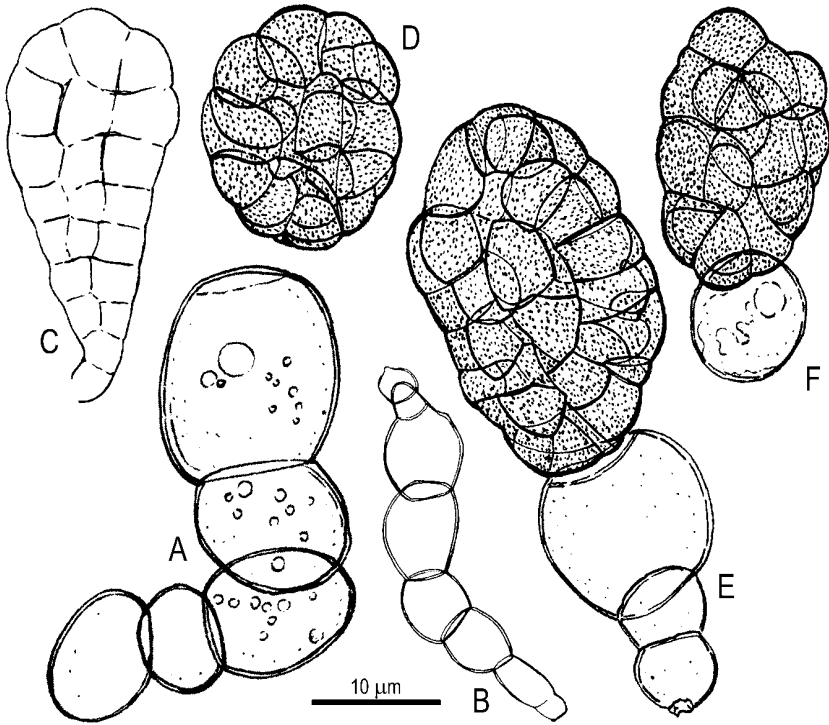
The close species is *Monodictys putredinis* (Wallr.) S. Hughes having weak swollen or not swollen conidiogeous and conidiophore cells.

**General distribution and hosts:** Europe, Asia. Presumably on *Betula* bark (Ellis, 1971; Melnik, Popushoi, 1992), sometimes on *Rhododendron*, *Prunus* (Melnik, 2000).

**Specimens examined:** Minsk district, Laporavichy, *Galeobdolon luteum*–*Stellaria holostea*–*Corylus avellana*–*Picea abies* forest, on dead branch of fallen *Sorbus aucuparia* tree, on bark, 27 II 1992 (MSK 5933). — *ibid.*, Slaboshchyna, *Oxalis acetosella*–*Corylus avellana*–*Picea abies*–*Pinus sylvestris* forest, on branch of *Sorbus aucuparia*, on bark (MSK 5891), on fallen trunk of *Sorbus aucuparia*, on bark (MSK 6080), 17 X 1993.



**Fig. 13.** Distribution of *Monodictys paradoxa* (Corda) S. Hughes in Belarus.



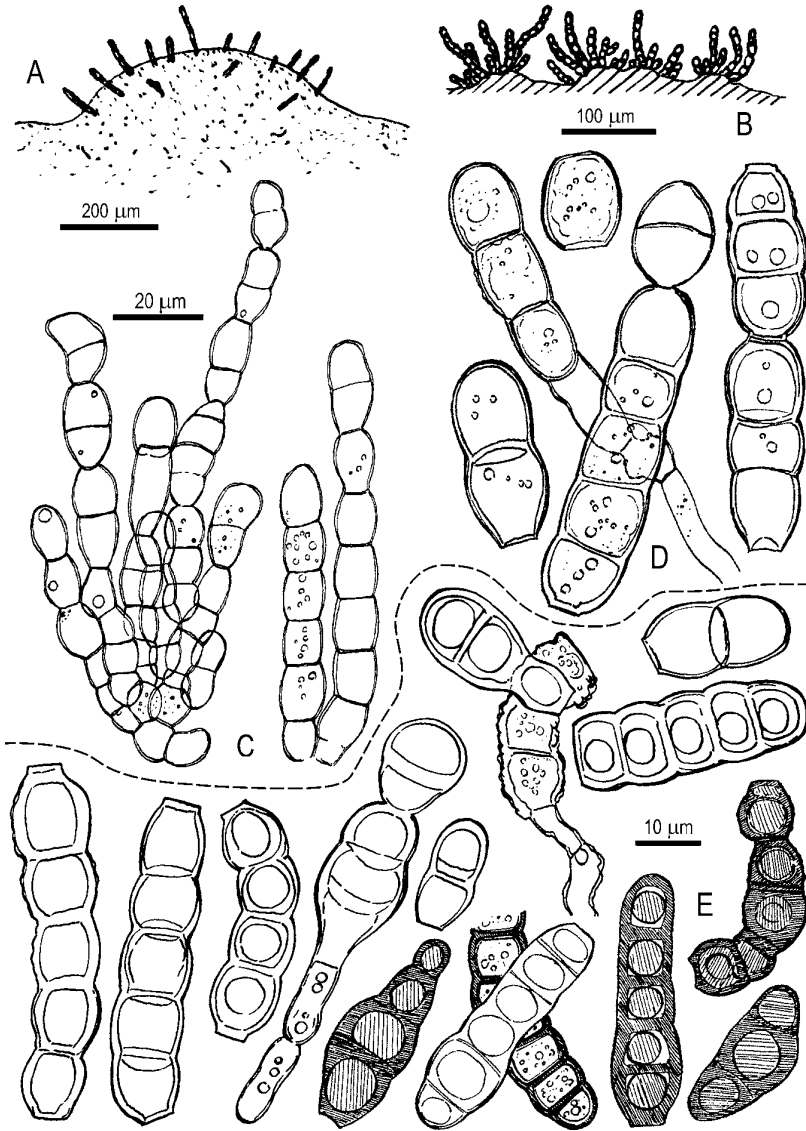
**Fig. 14.** *Monodictys paradoxa* (Corda) S. Hughes: A, B — conidiophores, C — immature conidium, D — separate conidium, E — conidium with a part of conidiophore, F — conidium with conidiogenous cell.

A, D-F — MSK 5891, B — MSK 6080, C — MSK 5933.

**8. *Taeniolella alta*** (Ehrenb. ex Pers.) S. Hughes, *Can. J. Bot.* **36**: 817, 1958. — Fig. 15, 16.

Colonies minute, not visible by naked eye, pulvinate. Mycelium submerged. Hyphae flexuous and swollen, brown or dark brown, 3.3–6 µm wide, septa *ca.* 15–20 µm apart. Conidiophores grow on hyphae or stroma-like hyphal nodes immersed in substratum. Hyphae gray brown, with cells 6–12 µm wide, 6–14 µm long, with small guttules, wall *ca.* 1 µm thick. Conidiophores dark brown, (3.3) 4.2–6.5 µm wide, septa 13–15 µm apart, walls thin- to slightly thickened, cells guttulate. Conidia in constricted or even chains, then disintegrating, brown to dark brown, commonly 2–6-septate, 35–60 × 8.5–14 µm wide (some up to 17 µm swollen and the most dark pigmented); septa 5–16.5 µm apart; the smallest conidia 1–2-celled, (10) 12–14.5 × (7) 9–11 µm, the longest conidia 11–13-septate and up to 120 µm long; walls up to 1.7–1.8 µm thick, smooth or rough, sometimes with adhered granules; septa up to 2.5 µm thick; conidial ends rounded or doliiform; conidial cells content grainy, multiguttulate, or with a big olivaceous guttule.





**Fig. 15.** *Taeniolella alta* (Ehrenb. ex Pers.) S. Hughes: A — conidial chains penetrating and protruding from the basidioma tuberculus of *Hypoderma setigerum*, B — sketch of colony on bark, C — conidial chains, D — conidia, one with portion of conidiophore, E — conidia, two with portion of conidiophore, some as example of dark pigmentation.

A — MSK 4992, B–D — MSK 5886, E — MSK 4843.

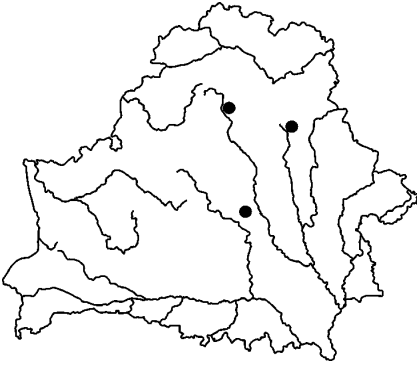


Fig. 16. Distribution of *Taeniolella alta* (Ehrenb. ex Pers.) S. Hughes in Belarus.

Close species are: *T. breviuscula* (Berk. et M.A. Curtis) S. Hughes with conidia commonly 2–3-phragmo-septate, capable to form 1–2 longitudinal septa, conidial cells shorter than in *T. alta*, some conidial chains with special “collars” forming possibly due to conidium proliferation; *T. exilis* (P. Karst.) S. Hughes with pronounced doliiform or conical tips of mostly 1–3-septate conidia; *T. stilbospora* (Corda) S. Hughes with conidia 7–11  $\mu\text{m}$  wide; *T. stricta* (Corda) S. Hughes with conidia 8–10  $\mu\text{m}$  wide, having reddish brown tint and uniguttulate cells (Ellis, 1971; Ellis, 1976; Ellis M. B., Ellis J. P., 1987; Melnik, 2000).

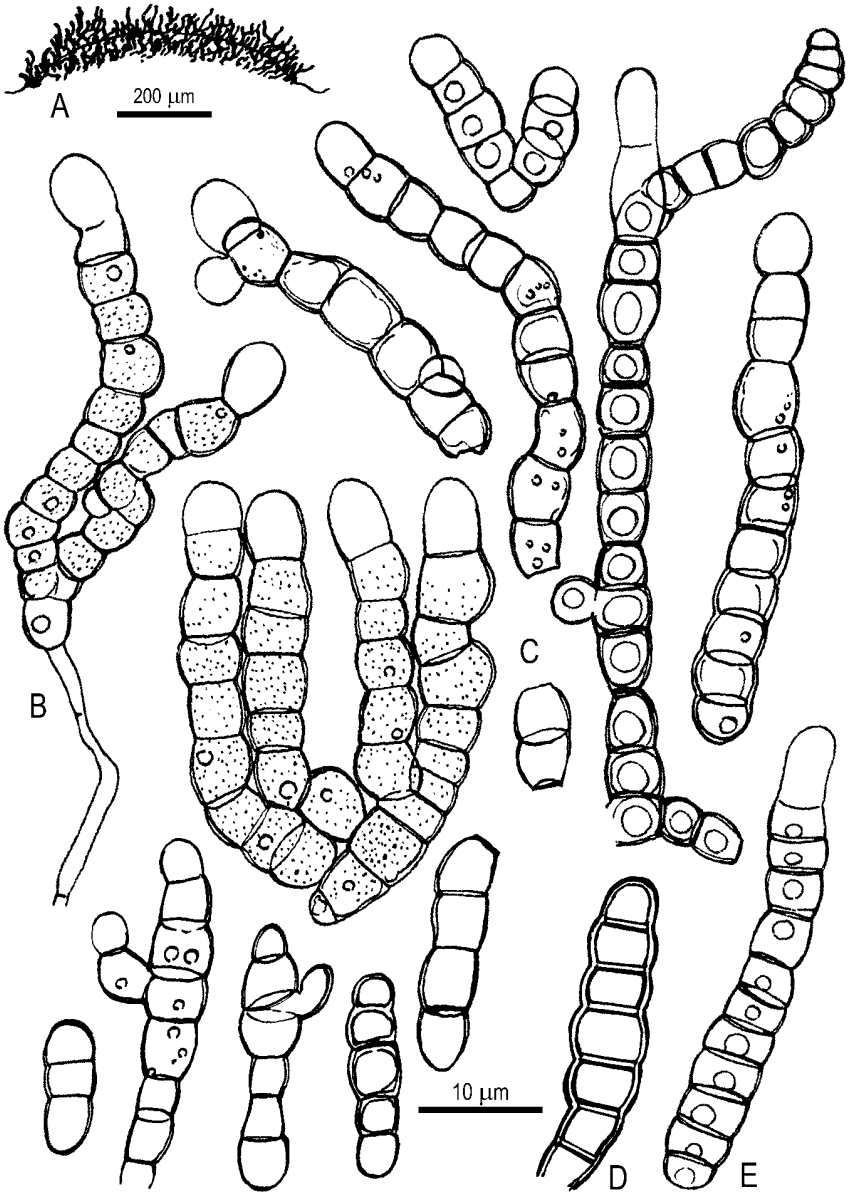
**General distribution and hosts:** Europe, Asia, N. America. The fungus is specialized to *Alnus* bark (Ellis, 1976; Ellis M. B., Ellis J. P., 1987; Melnik, Popushoi, 1992).

**Accompanying species:** in Belarus the fungus is commonly found in association with hyphomycete *Excipularia fusispora* and basidiomycete *Hyphoderma setigerum*. In the last case the conidia and conidiophores penetrate the basidioma (fig. 15 A).

**Specimens examined:** Asipovichy district, Vyalikaya Harozha, moss–*Quercus robur*–*Picea abies* forest, on fallen branch of *Alnus glutinosa*, on bark, 5 III 2000 (MSK 4992). — Lepel’ district, Byarezinski Biosphere Reserve, Kvetcha, *Carex acutiformis*–*Betula pubescens*–*Alnus glutinosa* forest, on fallen branch of *Alnus glutinosa*, on decayed wood, 3 VI 1999 (MSK 4843). — Talachyn district, Rhyzhychy, moss–*Oxalis acetosella*–*Picea abies* forest, on fallen branch of *Alnus incana*, on bark, 22 IV 2001 (MSK 5886).

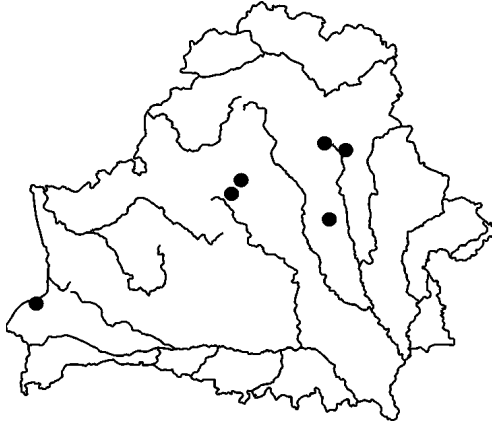
**9. *Taeniolina scripta*** (P. Karst.) P.M. Kirk, Trans. Brit. Mycol. Soc. **76**: 84, 1981; *Taeniolella scripta* (P. Karst.) S. Hughes, Can. J. Bot. **36**: 817, 1958. — Fig. 17, 18.

Colonies effuse, conidia masses form conspicuous sooty spots on bark or colonies invisible by naked eye. Hyphae straight, hyaline to brown, 1.7–3.3  $\mu\text{m}$  wide, with septa 10–13.5  $\mu\text{m}$  apart. Conidiophores subhyaline to brown, gradually turning into conidial chains, 1.7–5  $\mu\text{m}$  thick, cells 5.5–12.5  $\mu\text{m}$  long, with minute drops. Conidia in simple, branched or sprouting chains, mid brown to blackish, 6–50  $\times$  4.3–5.5 (6.5)  $\mu\text{m}$ , 1–10-septate, the longest conidia up to 110  $\mu\text{m}$  and 18–24-septate; chains moderately wavy (constricted), sometimes toruloid, cells 2.5–6.3  $\mu\text{m}$  long, mostly without guttules; walls of conidia up to 0.8–1  $\mu\text{m}$  thick; apical cells of conidia subhyaline, rounded cylindrical or subcapitate, sometimes small capitate.



**Fig. 17.** *Taeniolina scripta* (P. Karst.) P.M. Kirk: A — sketch of colony fragment, B — conidiophore with branched conidium, C-E — conidia and conidial chains.

A — MSK 5930, B, C — MSK 5884, D — MSK 5930, E — MSK 6077.



**Fig. 18.** Distribution of *Taeniolina scripta* (P. Karst.) P.M. Kirk in Belarus.

Close species are *Taeniolella pulvillus* (Berk. et Broome) M.B. Ellis with conidia 7–9  $\mu\text{m}$  thick, smooth or occasionally verrucose, and *T. stilbospora* with conidia 25–100  $\times$  7–11  $\mu\text{m}$ .

**General distribution and hosts:** Europe, Asia. On *Acer*, *Alnus*, *Betula*, *Carpinus*, *Corylus* etc. (Melnik, 2000). On *Betula*, *Corylus*, *Sorbus* (Ellis, 1976).

**Accompanying species:** in Belarus the fungus was found together with *Actinocladium rhodosporum*, *Brachysporium nigrum*, *Cryptocoryneum condensatum*, in complex with *Hyphoderma setigerum* and *Tubulicrinis angustus* (D.P. Rogers et Weresub) Donk basidiomata.

**Specimens examined:** **Kamyanets** district, Belavezhskaya Pushcha National Park, Yelinski Bor, *Oxalis acetosella*–*Picea abies*–*Alnus glutinosa* forest, on still-attached dead twig of *Corylus avellana*, on bark, 25 VI 2001 (MSK 6077). — *ibid.*, glade in moss–*Vaccinium myrtillus*–*Pinus sylvestris*–*Picea abies* forest, on fallen trunk of *Betula pendula*, on wood, 25 VI 2001 (MSK 6078). — **Klichau** district, Usakina, *Vaccinium myrtillus*–*Ledum palustre*–*Betula pubescens*–*Pinus sylvestris* forest, abundantly on thin vertical dead trunks of *Betula pubescens*, on bark, 20 III 1999 (MSK 5930). — **Lahoisk** district, Litvinkava, *Stellaria holostea*–*Alnus incana*–*Picea abies*–*Populus tremula* forest, on dead vertical trunk of *Corylus avellana*, on bark, 16 II 1999 (MSK 6076). — *ibid.*, *Oxalis acetosella*–*Stellaria holostea*–*Corylus avellana*–*Populus tremula*–*Picea abies* forest, on dead vertical trunk of *Corylus avellana*, on wood, 30 IV 2001 (MSK 5845). — **Minsk**, Drazdy, *Hepatica nobilis*–*Stellaria holostea*–*Quercus robur*–*Picea abies* grove, on bark of *Corylus avellana* stump, 11 XII 2000 (MSK 5884). — **Talachyn** district, Mikhailoushchyna, *Oxalis acetosella*–*Populus tremula*–*Quercus robur*–*Picea abies* forest, on lower side of fallen trunk of *Sorbus aucuparia* not in contact with floor, on bark, 22 IV 2001 (MSK 5785). — *ibid.*, Ploskai, thinned *Pleurozium schreberi*–*Pinus sylvestris* forest, on lower side of thin fallen trunk of *Betula pendula*, on bark, 20 IX 2001 (MSK 6083).

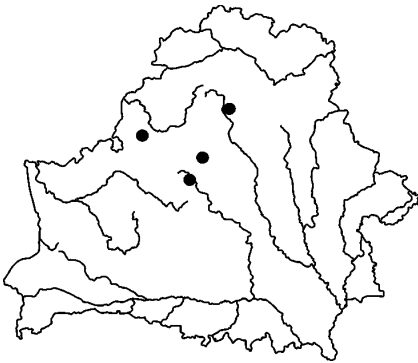
## 10. *Troposporella fumosa* P. Karst., Hedwigia 31: 299, 1892. — Fig. 19, 20.

Colonies inconspicuous, punctiform. Mycelium with superficial and immersed hyphae 3–4  $\mu\text{m}$  diam. Conidiophores grouped in clusters *ca.* 25  $\mu\text{m}$  wide at base. Individual conidiophores branched, 3–3.3 (5)  $\mu\text{m}$  wide, brownish, upper portion

paler (subhyaline), tapering, cells 6–8.5  $\mu\text{m}$  long. Conidiogeous cells monoblastic, determinate. Conidia lateral, helicoid, 1.5–2 times centrally or some excentrically coiled in one plain, 14–22  $\mu\text{m}$  diam, gray brown, light brown, yellowish brown, golden brownish, or with olivaceous tint, in mass brown or gray brown; filament 3–6  $\mu\text{m}$  thick, 9–11-septate, somewhat constricted at septa or even, cells sometimes with single big or several small guttules.

According to Goos (1987) colonies of the fungus are pulvinate, fawn or dark.

The close species is *Cirrenalia lignicola* P.M. Kirk, inhabiting *Quercus* and *Fagus* bark and wood. It differs from *T. fumosa* by olivaceous brown conidia, presumably with a hole in the center of coil, filament with rather swollen cells and not distinctly narrowed to the conidial base (Ellis M. B., Ellis J. P., 1987). Additional diagnostic features are reddish brown to black colonies, micro- or semi-macronematous conidiophores in the genus *Cirrenalia* (Goos, 1987).



**Fig. 19.** Distribution of *Tropospora fumosa* P. Karst. in Belarus.

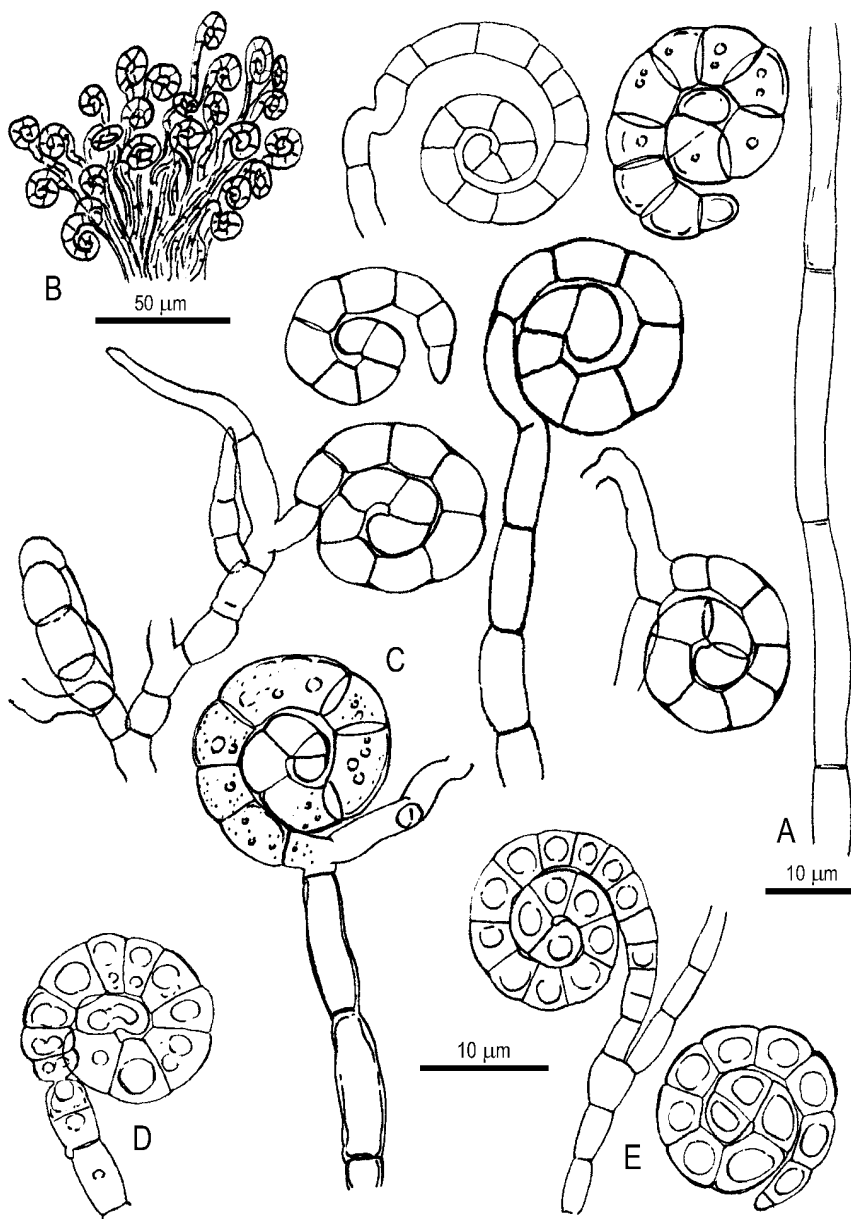
#### General distribution and hosts:

Europe, N. America, S. America, Australia, Oceania. Presumably on *Populus tremula* bark, sometimes on *Abies*, *Alnus*, *Eucalyptus*. The species is reported as very common in Leningrad region (Melnik, 2000).

**Accompanying species:** in Belarus the species was found together with *Actinocladium rhodosporum*, *Brachysporium nigrum*, *Cryptocoryneum condensatum*, in association with basidiomata of *Athelia* sp., *Botryobasidium laeve* (J. Erikss.) Parmasto, *Ceratobasidium cornigerum* (Bourdot) D.P. Rogers, *Hymenochaete cinnamomea* (Pers. : Fr.) Bres.

**Specimens examined:** **Lahoisk** district, Litvinkava, young *Oxalis acetosella*–*Stellaria holostea*–*Corylus avellana*–*Populus tremula* stand, on lower side of fallen *Populus tremula* trunk, on bark, 9 IX 2000 (MSK 5693). — **Lepel'** district, Byarezinski Biosphere Reserve, Domzharytsy, *Oxalis acetosella*–*Aegopodium podagraria*–*Corylus avellana*–*Populus tremula*–*Picea abies* forest, on fallen twig of *Populus tremula*, on bark, 15 VII 1997 (MSK 4127). — *ibid.*, on fallen branch of *Populus tremula* under fallen leaves, on bark, 13 XI 1997 (MSK 4374a). — **Minsk** district, Pryluchki, *Aegopodium podagraria*–*Oxalis acetosella*–*Picea abies*–*Quercus robur* forest, on fallen trunk of *Populus tremula*, on wood, 24 IV 2001 (MSK 5821). — **Smarhon'** district, Kreva, *Oxalis acetosella*–*Stellaria holostea*–*Picea abies*–*Populus tremula* forest, on fallen branches of *Populus tremula*, on wood, 28 V 2001 (MSK 5917, 5920).

Several *T. fumosa* conidia were found on uncommon host — fallen twig of *Sorbus aucuparia*, on bark, together with *Hyphoderma praetermissum* (P. Karst.) J. Erikss. et Å. Strid: Lahoisk district, Litvinkava, *Oxalis acetosella*–*Populus tremula*–*Picea abies* forest, 30 IV 2001 (MSK 5852).



**Fig. 20.** *Tropospora fumosa* P. Karst.: A — hypha, B — cluster of conidiophores with conidia, C–E — fragments of conidiophores, conidia.

A–C — MSK 4127, D — MSK 5693, E — MSK 4374a.

## Conclusion

Seven of described species — *Actinocladium rhodosporum*, *Cryptocoryneum condensatum*, *Excipularia fusispora*, *Helicosporium virescens*, *Taeniolella alta*, *Taeniolina scripta*, *Troposporella fumosa* — obviously are common saprobic fungi in Belarus that is confirmed by their host range, coenotic spectrum, and frequency in studied sites. We regard the association of *Actinocladium rhodosporum*, *Cryptocoryneum condensatum*, *Excipularia fusispora*, *Exosporium tiliae*, *Helicosporium virescens*, *Taeniolella alta*, *Taeniolina scripta*, *Troposporella fumosa* with resupinate basidiomycetes as facultative. The phenomenon is explained by similar ecological preferences and non-antagonistic interaction of fungi, leading to formation of repeating complexes on wood surface.

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**SUMMARY:** Ten species of dematiaceous fungi well discernible due to their conidia shape are described, illustrated, and mapped. The species were collected presumably in boreo-nemoral mixed spruce forests. Seven species, especially *Actinocladium rhodosporum* and *Cryptocoryneum condensatum*, are quite common saprobic wood-inhabiting fungi in studied sites. Eight of species were observed in facultative association with basidiomata of corticioid fungi (*Basidiomycetes*).

Key words: association, corticioid fungi, mitosporic fungi, *Actinocladium*, *Cryptocoryneum*, *Dematiaceae*, *Excipularia*, *Helicosporium*, *Taeniolella*, *Troposporella*.